PATENT ABSTRACTS OF JAPAN

(11)Publication number : 62-060378
(43)Date of publication of application : 17.03.1987

(51)Int.Cl. H04N 7/00
H04N 5/44
H04N 7/173

(21)Application number : 60-200034
(22)Date of filing : 10.09.1985

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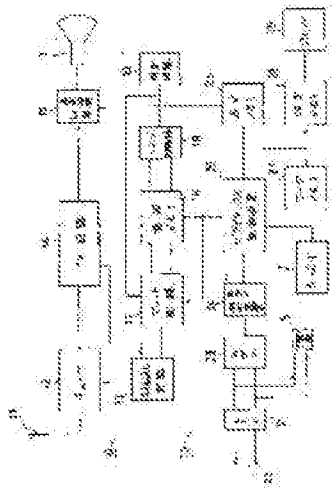
(54) TELEVISION RECEIVER

(57)Abstract:
PURPOSE: To search a desired program from a program list by reading out information stored in a means storing information on television programs including data on broadcasting stations, broadcasting times and program names on a display screen according to the prescribed input operation.
CONSTITUTION: After television program information is stored in a program memory 16 to terminate initialization, the operation is switched in a television mode through the operation of a keyboard 2 and a program key is operated. Then a videotex controller 25 displays the menu of the program on a CRT display part 3. When the corresponding number of a desired program is indicated through the key operation of a keyboard 2, the videotex controller 25 outputs the type code of the indicated program and a search instruction to a search circuit 17, and holds such a state as it is until the search is completed. When the search action is terminated to select the indicated station, the videotex controller 25 attains a state waiting other keys' inputs, simultaneously is made in a normal television receiving state, and image-displays the program of the station selected by the search circuit 17 on the CRT display part 3.



The television receiver of Claim 3, wherein said searching means performs excludes programs that are already completed in making the search.

[Detailed Description]
[Field of the Invention]

The present invention relates to a television receiver with television program information displaying function.

[Prior Arts and the Problems thereof]

At present, television receivers are found in almost every home and its usage rate is very high. Thus, viewers at home with television receivers often watch news or weather forecasts. Also, there are instances where a viewer may want to watch a movie or a baseball game. When a viewer wants to watch a specific program, the viewer may consult a television program guide in a newspaper. However, there are instances where no newspapers are up for grabs or looking for a newspaper is simply too bothersome for the viewer. This is particularly so while the viewer is outdoors with a portable television.

[Objective of the Invention]

The objective of the present invention is to provide a television receiver that displays a program list on a television screen in a simple manner and enables one to easily find a program he or she desires from the program list.

[Gist of the Invention]

The present invention is configured to install program information memory means that retains television program information, which comprises broadcast station data, broadcast date and time data, and program name data, and to decipher the television program information retained in said means to a display screen in accordance with a prescribed input operation.

[Embodiment of the Invention]

In the following, an embodiment of the present invention is described with reference to the accompanying drawings. This embodiment illustrates an example in which television program information is memorized in a program memory by using a telesoft [K&C NOTE 1] of a character diagram information system (i.e., a videotex [K&C NOTE2]) and the television program information retained in the program memory is displayed on a CRT (Cathode Ray Tube) screen in accordance with a prescribed key operation. Firstly, with reference to Fig. 2, the exterior configuration of a television receiver is explained. In Fig. 2, reference numeral 2 denotes a case

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K&C NOTE 1 The term "telesoft" is a neologism used in Japan. It refers to computer software obtained via a computer network (e.g. a computer program downloaded via the Internet).

K&C NOTE2 The term "videotex" refers to an information system that transmits and receives characters or images through a communication network.

of the television receiver, inside of which a television receiver circuit and a receiver circuit of a character diagram information system (i.e. a videotex) are installed. The front side of the upper portion of the case 1 is formed in a slightly slant shape and a keyboard 2 is installed therein. Also, a CRT display part 3 is disposed at an upper part of the case 1, while at its side a telephone placing part 4 is formed. A telephone 5 is placed on the telephone placing part 4.

Next, the constitution of the television receiver circuit 10 and the receiver circuit 20 of the character diagram information system, which are illustrated in detail in Fig. 1, are explained. In Fig. 1, reference numeral 12 denotes a tuner of the television receiver circuit 10, which selects the broadcast radio wave of a desired channel from the television broadcast radio wave induced in an antenna 11 under the control of an automatic channel circuit 13, converts it to an intermediate frequency, and outputs it to a TV circuit 14. This TV circuit 14 amplifies the television signal sent from the tuner 12, performs image-detection, frequency separation, voice detection etc., outputs the image signal through a display switching circuit 15 to a CRT display part 3, and outputs the voice signal to a speaker (not shown). Also, the TV circuit 14 generates a tuning signal from the signal from the tuner 12, and outputs it to the automatic channel circuit 13. Also, reference numeral 16 denotes a program memory that retains television program information. A search circuit 17 and a flag control circuit 18 are connected to the program memory 16. Also, reference numeral 19 denotes a clock circuit, which computes date and time, and outputs the current date and time data to the search circuit 17 and the flag control circuit 18. The flag control circuit 18 controls rewriting of a flag to the program memory 16 (e.g., an on-air program flag, an off-air program flag, etc.) in accordance with the time data. The search circuit 17 searches the contents of the program memory 16 in accordance with the instructions from a keyboard 2 at the receiver circuit 20 of the character diagram information system, and outputs a channel select signal to the automatic channel circuit 13.

The program memory 16 retains, for example, 1 month's program information (i.e., program information of a one month period). The address area is divided by dates, and a leading address (the number X) is set for each of the areas. Fig. 3 illustrates the constitution of a portion of the area (May 12) of the program memory 16, wherein information such as date, channel, day of the week, start time, end time, type of the program, flag F1 for indicating whether the program is currently being broadcast (i.e., on-air), flag F2 for indicating whether the program broadcast has been terminated (i.e., off-air), program name, etc. are set as program information. The program information, which is read by telesoft from the information center of the videotex, is recorded through the receiver circuit 20 of the character diagram information system.

Meanwhile, in the receiver circuit 20 of the character diagram information system, a circuit control part 21 is connected to a telephone line (not shown) through a terminal part 22. Also, the circuit control part 21 is connected not only with the telephone 5, but also with a modem 23 and a modem control device 24 through a videotex control device 25. Also, the videotex control device 25 is connected with not only a keyboard 2, a display memory 26 and a work memory 27, but also a printer 29 through a print memory 28. The display memory 26 is a memory that retains the received screen of a videotex, and the data stored therein are sent to the CRT display part 4 through the display switching circuit 15. Also, the videotex control device 25, upon completing the reading of television program information from the information center of the videotex in accordance with the instructions from the keyboard 2, outputs the television program information to the television receiver circuit 10 to store it in the program memory 16.

Also, when the type of the program is designated by the keyboard 2, the videotex control device 25 outputs its type code and a search instruction to the search circuit 17.

Next, the search circuit 17 in Fig. 1 is described in more detail with reference to Fig. 4. In Fig. 4, reference numeral 171 denotes an address generation circuit, which is provided with date data from the clock circuit 19 in Fig. 1 and a program search instruction through the videotex control device 25 from the keyboard 2. The address generation circuit 17 operates in accordance with the search instruction from the keyboard 2, generates address data X in accordance with the date data provided from the clock circuit 19, and sets it in the address register 172. Then, the leading address of the date-classified-area (i.e., the area classified by dates) of the program memory 16 illustrated in Fig.1 is designated by the address data X set in the address register 172. Then, in accordance with the designated address, 1 month's program information (i.e., data, channel, day of the week, start time, end time, type, flag F1, flag F2 and program name) is read and written to a buffer 173. Then, among the information recorded in the buffer 173, the channel information, the type information, which indicates the type of the program, and the flag F1 are inputted into a channel voltage generation circuit 174, a type code comparison circuit 175 and a flag distinguishing circuit 176, respectively. The flag distinguishing circuit 176 determines whether the flag F1 read from the buffer 173 is "1" or "0," and if "0," outputs a "+1" signal to the address register 172. If the flag F1 is "1," a comparison instruction is output to the type code comparison circuit 175. Also, the type code comparison circuit 175 is provided, through the type code register 178, with a code indicative of the program type inputted through the control device 25 from the keyboard 2. When the "1" signal is provided from the flag distinguishing circuit 176, the type code comparison circuit 175 compares the type code read from the buffer 173 and the type code inputted from the type code register 178, and if they match, outputs a match signal to the channel voltage generation circuit 174. When they do not match, a non-match signal is output to the address register 172 through an OR circuit 177. The channel voltage generation circuit 174, when provided with the match signal from type code comparison circuit 175, generates a channel voltage in accordance with the channel information given from the buffer 173 and outputs it to an automatic channel circuit 13.

Next, the operation of the above embodiment is explained. Prior to the search operation of a television program, 1 month's television program information, for example, are read by the telesoft from the information center of the videotex, and are stored in the program memory 16 of the television receiving circuit 10, as shown in the flowchart of Fig. 5. That is, the user, firstly, designates a videotex mode by manipulating the keyboard 2 as shown in step A1 of Fig. 5. Then, the information center of the videotex is called by the telephone 5 and, as shown in step A2, 1 month's television program information (i.e., television program data comprising broadcast station data, broadcast time data, program type data), for example, are received by the telesoft. In the videotex mode, the display switching circuit 15 is switched to the display memory 26 side, and the received screen of the videotex retained by the display memory 26 is displayed on the CRT display screen 3. However, when the television program information is sent from the information center as telesoft, the videotex control device 25 stores the television program information in the program memory 16 in step A3. Then, the videotex control device 25 sends an instruction to the search circuit 17, and in step A4, performs the initial process, which is described in detail in Fig. 6, and aborts the program information receiving process.

Next, the initial process of step A4 is described in detail with reference to Fig. 6. The

search circuit 17, firstly, sets a designated address N of the program memory 16 to "1" (the leading address) as shown in step A11 of Fig. 6, and reads the contents of the designated address from the program memory 16 in step A2. Then, as shown in step A13, the date of the program read from the program memory 16 and the current date indicated by clock circuit 19 are compared. When the current date is bigger (i.e., the broadcast date has already been past before yesterday), the process moves to step A14 to set the flag F2, and thereafter, moves to step A16. Also, when the current date and the program date is the same, the process moves from step A13 to step A15, and whether the current time indicated by the clock circuit 19 is past the end time of the program is determined. If the current time is past the end time of the program, the process moves to step A14, and the flag F2 is set. However, if the current time is not past the end time of the program, the process moves from step A15 to step A16. Also, if the current date is smaller than the program date (i.e., if it is determined that the program has not yet been broadcast) in step A13, the process moves straight to step A16. In step A16, whether the designated memory N of the program memory 16 has reached the end address is determined. If the end address has not been reached, the designated address N is set to "+1" in step A, and the process returns to step A12. Thereafter, the same process is repeated, and the program information is sequentially read from the program memory 16 to determine whether the broadcast of the program has ended. For the program that the broadcast has been terminated, the flag F2 is set. Then, when the designated address N of the program memory 16 reaches the end address, this state is detected in step A16 and the initial process is aborted. Here, the end address N may be fixed. However, the initial process may be aborted when the end code is read from the program memory 16.

After storing the television program information in the program memory 16 and aborting the initial process as mentioned above, an arbitrary program type may be designated by manipulating the keyboard 2 to automatically perform a search. When a television program is searched, as shown in step B1 of Fig. 7, it switches to a TV mode by manipulating the keyboard 2 to operate a program key. When switched to the TV mode, the videotex control device 25 always checks for program key manipulations as shown in step B2. When there are no program key manipulations, it moves into a waiting state for other key input and a conventional TV receiving state, and the image signal output from the TV circuit 14 is displayed on the CRT display part 3. However, if there is a program key manipulation, the videotex control device 25 moves from step B2 to step B3, and displays the menu of the program on the CRT display part 3. That is, as shown in Fig. 8, the program menu (e.g., news, weather forecast, baseball, sports, movies, culture, drama, songs, cartoon, quiz, wide program, short story, etc.) with corresponding numbers are displayed on the CRT display part 3. The user, as shown in step B4, designates by manipulating the keyboard 2 a number corresponding to the desired program from the program menu displayed on the CRT display part 3. When a program designate number is inputted, the videotex control device 25, as shown in step B5, outputs the type code and the search instruction of the designated program, and thereafter maintains the status quo in step B6 until the completion of the search. Then, the search operation of the search circuit 17 is aborted. When the designated station is selected, the videotex control device 25 moves into the waiting state for other key input and the conventional TV receiving state. Further, the program of the station selected by the search circuit 17 is displayed on the CRT display part 3.

Next, the detailed operation of the search circuit 17 and the flag control circuit 18 is explained. In Fig. 1, the program memory 16, the search circuit 17, the flag control circuit 18

and the clock circuit 19 is supplied with operation voltage at all times regardless of the on/off state of the power supply. The clock circuit 19 performs clock processing to indicate the current time and the current date at all times, and supplies the current time information and the current date information to the search circuit 17 and the flag control circuit 18. The flag control circuit 18 performs a rewrite control of the flags F1 and F2 in the program information retained in the program memory 16, based on the time information from the clock circuit 19. Fig. 9 illustrates the flowchart of the rewrite process of the flags F1 and F2. In the following, its operation is described in accordance with the flowchart. The flag control circuit 18, as shown in step C1 of Fig. 9, performs detection processing of a one minute pulse sent from the clock circuit 19, and upon detecting the one minute pulse, moves to step C2 and read the date data from clock circuit 19. Then, the flag control circuit 18, as shown in step C3, in accordance with the date data read from the clock circuit 19, generates a leading address X and an end address X_{END} for the corresponding date area of the program memory 16. Then, the flag control circuit 18, as shown in step C4, sets the designated address N for the program memory 16 as the leading address X, and in step C5, reads the memorized content of the program memory 16. Then, in step C6, whether the flag F2 is set is determined. If the flag F2 is not set, the process moves to step C7, and whether the current time is past the broadcast start time is determined. Then, if the current time is past the broadcast start time, the process moves to step C8, and whether the current time has reached the broadcast end time is determined. If the current time has not reached the broadcast end time (i.e., the broadcast program is on-air), the flag F1 is set in step C9. If the current time has reached the broadcast end time, the process moves from step C8 to step C10, and the flag F2 is set while the flag F1 is reset. When the processing of steps C9 and C10 are finished, or when in step C6 the flag F2 is determined to be set (i.e., the broadcast has ended), or the current time is determined to have not reached the broadcast start time in step C7, then the process moves to step C11 and whether the memory designated address N has reached the end address is determined. If it has not reached the end address, the memory designated address N is set to "+1" in step C12, and the process returns to C5. Thereafter, the same operations are repeated, and if the program is currently being broadcast, the flag F1 is set. If the program broadcast has ended, the flag F2 is set. Then, when the process for the date area of the day of the program memory 16 is finished, the result of step C11 is set to "yes," and the process returns to step C1 and waits until the next one minute pulse is sent from the clock circuit 19. Through the aforementioned processes, the rewrite control of the flags F1 and F2 are performed every time a one minute pulse is outputted from the clock circuit 19.

Even though the rewrite of the flags F1 and F2 of the program memory 16 is always performed by the flag control circuit 18 through the aforementioned processes, the type of the program is designated by manipulating the keyboard 2 as mentioned above. When a type code and a search instruction are output from the videotex control device 25 to the search circuit 17 in step B5 of Fig. 7, a search process of the program is initiated by the search circuit 17. That is, the type code sent from the videotex control device 25 to the search circuit 17 is set at a type code register 178. Also, the search instruction is input into an address generation circuit 171. The address generation circuit 171, when provided with the search instruction, in accordance with the date information from the clock circuit 19, generates a leading address X of the date-classified area (i.e., the area classified by date) of the program memory 16 and sets it in the address register 172. By the date set in the address register 172, the leading address X of the date-classified area of the program memory 16 is designated, and the one program's information at the designated address from the program memory 16 is read at the buffer 173. When the program information

is read at the buffer 173, firstly, the flag F1 is sent to the flag distinguishing circuit 176 so that its content can be determined. Since the flag F1 is "0" when the program read from the buffer 173 is not currently being broadcast, a "+1" signal is output from the flag distinguishing circuit 176 through the OR circuit 177 and the content of the address register 172 becomes "+1" in this instance. Accordingly, the next address of the program memory 16 is designated, and the program information memorized in the address is read 173 from the buffer 173. Also, the content of the flag F1 is determined by the flag distinguishing circuit 176 in the same manner as mentioned above. When the flag F1 is "0," the operation is repeated in a manner same as the above. However, when the flag F1 is "1" (i.e., when the program is currently being broadcast), a "1" signal is sent from the search circuit 17 to the type code comparison circuit 175. The type code comparison circuit 175, when provided with the "1" signal from the flag distinguishing circuit 176, compares the type code maintained in the buffer 173 at that time, and when not the same (i.e., the program read from the buffer 173 is not the program designated by the keyboard 2), a non-match signal is output through the OR circuit 177 to the address register 172. As a result, the content of the address register 172 becomes "+1," so that the next address of the program memory 16 is designated and its contents are read by the buffer 173. When new program information is set in the buffer 173, the flag F1 and the type code is checked in the same manner as above. If the type code maintained in the buffer 173 and the type code maintained in the type code register 178 is the same, a match signal is sent from the type code comparison circuit 175 to the channel voltage generation circuit 174. That is, if "news," for example, is designated as the program type by the keyboard 2, a match signal is output from the type code comparison circuit 175 and sent to the channel voltage generation circuit 174 when the "news" program currently being broadcast at the buffer 173 from the program memory 174 is read. The channel voltage generation circuit 174, when provided with the type code match signal, generates a voltage in accordance with the channel code maintained in the buffer 173 and outputs it to the automatic channel circuit 13. The automatic channel circuit 13, when provided with the channel voltage from the channel voltage generation circuit 174, controls the receiving frequency of the tuner 12 in accordance with the channel voltage and selects the station of the designated channel. When the type of the program has been designated by the keyboard 2 accordingly, the channel currently broadcasting the program is selected and displayed on the CRT display screen 3. If no station broadcasts the programs of the designated type (e.g., "news"), the selected station at that time is received without any change. Also, when 2 or more stations are concurrently broadcasting the programs of the designated type, the station of the low order is selected and received.

Next, the operation for displaying the program list memorized in the program memory 16 on the CRT display part 3 is described. The display of the program list is designated by the key input of the keyboard 2, as shown in Fig. 10, the following may be designated as the displayed program list.

(1) List of all the programs scheduled for future broadcast

(2) List of one day's programs for the designated day

(3) List of programs of the designated genre (or type) scheduled for future broadcast

(4) List of programs of the designated channel scheduled for future broadcast

(5) List of one day's programs for the designated day of the week (very close day)

(6) List of currently broadcast programs

When displaying the program lists of items (1)-(6), as shown in Fig. 10, for example, the list of item (1) may be designated by single manipulation of the "program list" key (i.e., key manipulation D); the list of item (2) may be designated by a combination of the "weather" input and the "program list" key manipulations (i.e., key manipulation E); the list of item (3) may be designated by a combination of the "type" input and the "program list" key manipulations (i.e., key manipulation F); the list of item (4) may be designated by a combination of the "channel" input and the "program list" key manipulations (i.e., key manipulation G); the list of item (5) may be designated by a combination of the "the day of the week" input and the "program list" key manipulations (i.e., key manipulation H); and the list of item (6) may be designated by a combination of the "on-air" input and the "program list" key manipulations (i.e., key manipulation I). When the manipulations for the program list display designation are performed through the keyboard 2, the videotex control device 25 performs the processes illustrated in Figs. 11-16.

Fig. 11 shows the process performed by the videotex control device 25 when the program list of the item (1) (i.e. the list of all the programs scheduled for future broadcast) is displayed. The videotex control device 25, when the key manipulation D of the item (1) is performed by the keyboard 2, firstly, as shown in step D1, sets the designated address N of the program memory to 1 (the leading address), and in step D2, reads the content of the program memory 16. Next, as shown in step D3, whether the date of the day and the date of the program is the same is determined. If they are the same, whether the current time has reached the end time of the program is determined in step D4. When the broadcast of the program read from the program memory 16 has not yet ended, as shown in step D5, the program information is output to the work memory 27, and thereafter, the process moves to step D6. Also, when the dates are determined to be not the same in step D3, and when the broadcast of the program is determined to be finished in step D4, the process moves to step D6. In step D6, whether the designated address N of the program memory 16 has reached the final address is determined. If it has not reached the final address, the designated address N is updated in step D7, and the process returns to step D2. Hereinafter, the same processing operations are repeated, and among the program information memorized in the program memory 16, only the program information that are to be broadcast in the future are selected and recorded in the work memory 27. Further, when the designated address of the program memory is determined as having reached the final address in step D6, the process moves to step D8, and the program information memorized in the work memory 27 is edited into a more eye-friendly format. Thereafter, as shown in step D9, the edited program information from the work memory 27 is recorded in the display memory 26, and also, sent from the display memory 26 to the CRT display part 3. That is, the list of all of the programs to be broadcast in the future is displayed on the CRT display part 3.

Next, with reference to Fig. 12, the operations when the key manipulation E (i.e., the combination of "weather" input and the "program list" key manipulation) of the item (2) is performed are described. When the key manipulation E of the item (2) is performed by the keyboard 2, firstly, as shown in step E1 of Fig. 12, the videotex control device 25 generates the leading address X for the date of the day of the date-classified area as the designated address N of the program memory 1, and in step E2, reads the contents of the program memory 16. Then, after outputting the program information to the work memory 27 as shown in step E3, the process moves to E4, in which whether the designated address N of the program memory 16 has reached

the final address of the date area is determined. If the final address has not been reached, the designated address N is updated in step E5, and the process moves to step E2. Thereafter, the same process operations are repeated, and only the program information that is broadcast on the designated day is selected from the program information stored in the program memory 16 and recorded in the work memory 27. When the designated address N of the program memory 16 is determined to have reached the final address of the date-classified area in step E4, the process moves to step E6 to edit the program information memorized in the work memory 27 into a more visible format. Thereafter, as shown in step E7, the edited program information from the work memory 27 is recorded in the display memory 26. Also, it is sent from the display memory 26 to the CRT display part 3 to be displayed thereon. That is, the one day's program list of the designated day is displayed on the CRT display part 3.

Next, with reference to Fig. 13, the operations when the key manipulation F (i.e., the combination of "type" designation and the "program list" key manipulation) of the item (3) is performed are described. When the key manipulation F of the item (3) is performed by the keyboard 2, firstly, as shown in step F1 of Fig. 13, the videotex control device 25 sets the designated address N of the program memory 16 to 1 (i.e., the leading address), and in step F2, reads the contents of the program memory 16. Then, whether the flag F2 is set to "1" or "0" (i.e. whether the broadcast of the program has ended or not) is determined as shown in step F3. If the broadcast has not yet ended, then whether the type code of the program and the designated type code match or not is determined. If the type code of the program and the designated type code match, as shown in step F5, the program information is output to the work memory 27, and thereafter, the process moves to step F6. If all of the broadcasts are determined as having ended in step F3, or if the type codes are determined as not matching in step F4, the process moves to step F6. In step F6, whether the designated address N of the program memory 16 has reached the final address is determined. If the designated address has not reached the final address, the designated address N is updated in step F7, and the process returns to step F2. Thereafter, the same process operations are repeated, and only the program information of the designated type is selected from the program information stored in the program memory 16 and recorded in the work memory 27. When the designated address N of the program memory 16 is determined to have reached the final address in step F6, the process moves to step F8 to edit the program information memorized in the work memory 27 into a more visible format. Thereafter, as shown in step F9, the edited program information from the work memory 27 is recorded in the display memory 26. Also, it is sent from the display memory 26 to the CRT display part 3 to be displayed thereon. That is, the list of programs of the designated type to be broadcast in the future is displayed on the CRT display part 3.

Next, with reference to Fig. 14, the operations when the key manipulation G (i.e., the combination of "channel" designation and the "program list" and "channel" key manipulation) of the item (4) is performed and the list of the programs to be broadcast on the designated channel are displayed are described. When the key manipulation G of the item (4) is performed by the keyboard 2, firstly, as shown in step G1 of Fig. 14, the videotex control device 25 sets the designated address N of the program memory 16 to 1 (i.e., the leading address), and in step G2, reads the contents of the program memory 16. Then, whether the flag F2 is set to "1" or "0" (i.e. whether the broadcast of the program has ended or not) is determined as shown in step G3. If the broadcast has not yet ended, then whether the type code of the program and the designated type code match or not is determined in step G4. If the type code of the program and the

designated type code match, as shown in step G5, the program information is output to the work memory 27, and thereafter, the process moves to step G6. If all of the broadcasts are determined as having ended in step G3, or if the type codes are determined as not matching in step G4, the process moves to step G6. In step G6, whether the designated address N of the program memory 16 has reached the final address is determined. If the designated address has not reached the final address, the designated address N is updated in step G7, and the process is repeated. Among the program information retained in the program memory 16, only the program information that are to be broadcast in the future on the designated channel is selected and recorded in the work memory 27. When the designated address N of the program memory 16 is determined to have reached the final address in step G6, the process moves to step G8 to edit the program information memorized in the work memory 27 into a more visible format. Thereafter, as shown in step G9, the edited program information from the work memory 27 is recorded in the display memory 26. Also, it is sent from the display memory 26 to the CRT display part 3 to be displayed thereon. That is, the list of programs that are to be broadcast in the future on the designated channel is displayed on the CRT display part 3.

Next, with reference to Fig. 15, the operations when the key manipulation F (i.e., the combination of "the day of the week" designation and the "program list" key manipulation) of the item (5) is performed and the one day's program list is displayed are described. When the key manipulation H of the item (5) is performed by the keyboard 2, firstly, as shown in step H1 of Fig. 15, the videotex control device 25 determines whether the current day and the designated day are the same. If they are the same, the process moves to step H2, in which the leading address X of the date of the current day of the date-classified area of the program memory 16 is generated. In step H3, the content of the program memory 16 is read. Then, as shown in step H4, the program information is output to the work memory 27, and the process moves to step H5. In step H5, whether the designated address N of the program memory 16 has reached the final address of the date-classified area is determined. If the designated address has not reached the final address, the designated address N is updated in step H6, and the process returns to step H3. Thereafter, the process is repeated. Among the program information retained in the program memory 16, only the program information that are broadcast on the designated day of the week, for the present case, is selected and recorded in the work memory 27. When the designated address N of the program memory 16 is determined to have reached the final address in step H5, the process moves to step H7 to edit the program information memorized in the work memory 27 into a more visible format. Thereafter, as shown in step H8, the edited program information from the work memory 27 is recorded in the display memory 26. Also, it is sent from the display memory 26 to the CRT display part 3 to be displayed thereon. That is, the list of one day's program for the designated day of the week is displayed on the CRT display part 3.

Next, with reference to Fig. 16, the operations when the key manipulation I (i.e., the "on air" key manipulation) of the item (6) is performed are described. When the key manipulation I of the item (6) is performed by the keyboard 2, firstly, as shown in step I1 of Fig. 16, the videotex control device 25 generates the leading address X for today's date of the date-classified area as the designated address N of the program memory 16, and in step I2, reads the contents of the program memory 16. Then, whether the flag F2 is set to "1" or "0" (i.e. whether the program is being broadcast or not) is determined as shown in step I3. If the program is currently being broadcast, then, as shown in step I4, the program information is output to the work memory 27, and thereafter, the process moves to step I5. If the program is determined as currently being

broadcast, then the process moves to step I5 without performing step I4.

In step I5, whether the designated address N of the program memory 16 has reached the final address of the date area is determined. If the final address has not been reached, the designated address N is updated in step I6, and the process returns to step I2. Thereafter, the same process operations are repeated, and only the program information that is currently being broadcast is selected from the program information stored in the program memory 16 and recorded in the work memory 27. When the designated address N of the program memory 16 is determined as having reached the final address of the today's date area in step I5, the process moves to step I7 to edit the program information memorized in the work memory 27 into a more visible format. Thereafter, as shown in step I8, the edited program information from the work memory 27 is recorded in the display memory 26. Also, it is sent from the display memory 26 to the CRT display part 3 to be displayed thereon. That is, the list of programs currently being broadcast is displayed on the CRT display part 3.

Also, in the above embodiment, when the program list cannot be wholly displayed on one screen, it may be scrolled, displayed by days or channels, or by pages. Certain key (e.g., return key) manipulations may enable one to move from one page to another.

Also, in the above embodiment, when the program information retained in the program memory 16 is configured to include information on the entertainers, the listings on the programs starring the designated entertainers may be displayed.

[Effect of the Invention]

As evidently appreciated from the above descriptions, according to the present invention, program information memory means memorizing television program information that includes broadcast station data, broadcast date and time data, and program name data are installed, and the television program information stored in the means are configured to be selected and read to the display screen in accordance with prescribed key manipulations. Accordingly, a program list of an arbitrary program (e.g., all of the programs scheduled for future broadcast, the programs of the designated date, the programs of the designated type, the programs of the designated channel, the program of the designated day of the week, the program that are currently being broadcast, etc.) may be easily displayed on the television screen. Thus, it is very convenient when no newspapers are around.

[Brief Description of the Drawings]

The drawings illustrate an embodiment of the present invention.

Fig. 1 is a block diagram illustrating a circuit configuration.
Fig. 2 illustrates a perspective view of an exterior configuration.
Fig. 3 illustrates an example of information retained in a program memory.
Fig. 4 is an exploded block diagram of the search circuit in Fig.1.
Fig. 5 is a flow chart on program information receiving procedure.
Fig. 6 is a flow chart detailing the initial process of Fig. 5.
Fig. 7 is a flow chart on program search procedure.

Fig. 8 illustrates a display example of a program menu.
Fig. 9 is a flow chart on flag rewrite process on a program memory.
Fig. 10 is an example key operation for displaying designating and displaying various types of program lists.
Fig. 11 is a flow chart on processing operations for displaying a list of all the programs scheduled for future broadcast.
Fig. 12 is a flow chart on processing operations for displaying a program list of a designated date.
Fig. 13 is a flow chart on processing operations for displaying a list of programs of a designated type.
Fig. 14 is a flow chart on processing operations for displaying a program list of a designated channel.
Fig. 15 is a flow chart on processing operations for displaying a program list of a designated day-of-week.
Fig. 16 is a flow chart on processing operations for displaying a list of currently broadcast programs.

1: Television Receiver Case
2: Keyboard
3: CRT Display Part
4: Telephone Placing Part
5: Telephone
10: Television Receiver Circuit
11: Antenna
12: Tuner
13: Automatic Channel Circuit
14: TV Circuit
15: Display Switching Means
16: Program Memory
17: Search Circuit
18: Flag Control Circuit
19: Clock Circuit
20: Character Diagram Information System Receiver Circuit
21: Circuit Control Part
23: Modem
24: Modem Control Device
25: Videotex Control Device
26: Display Memory

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[DRAWINGS]

Fig. 1

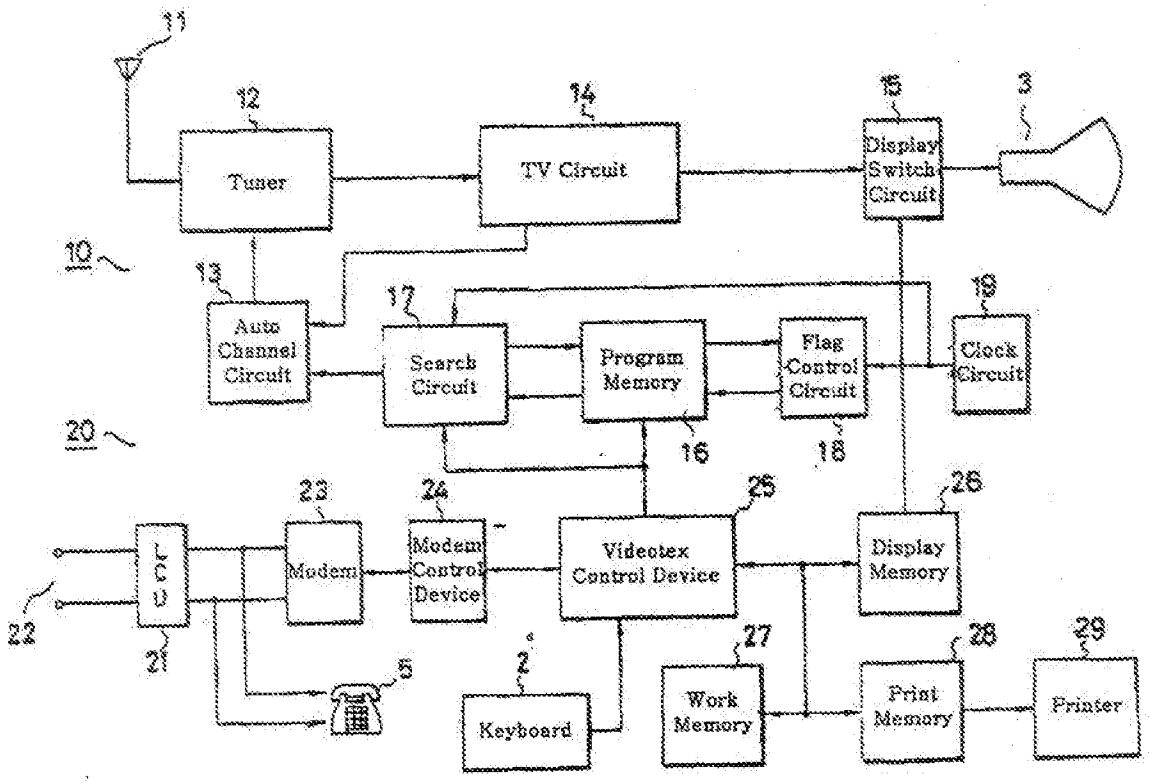

Fig. 2

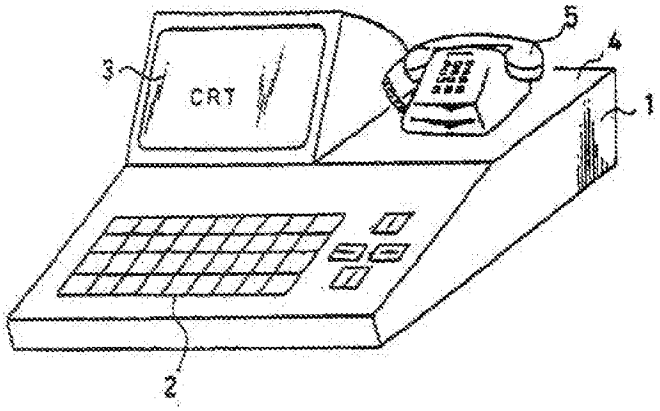

Fig. 3

16

Date	Channel	Day of the week	Start	End	Type	F_1	F_2	Program name
5月12日	1 C H	S A T	6 : 00	6 : 15	ニュース			
5月12日	1 C H	S A T	6 15	6 : 45	教養			
5月12日	1 C H	S A T	6 : 45	7 : 20	ニュース			
5月12日	1 C H	S A T	7 : 20	7 : 25	天気予報			
⋮	⋮	⋮	⋮	⋮	⋮			⋮
5月12日	4 C H	S A T	13 : 00	16 : 30	野球			
⋮	⋮	⋮	⋮	⋮	⋮			⋮
5月12日	6 C H	S A T	19 : 00	19 : 30	マンガ			
5月12日	6 C H	S A T	19 : 30	20 : 00	クイズ			

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Fig. 4

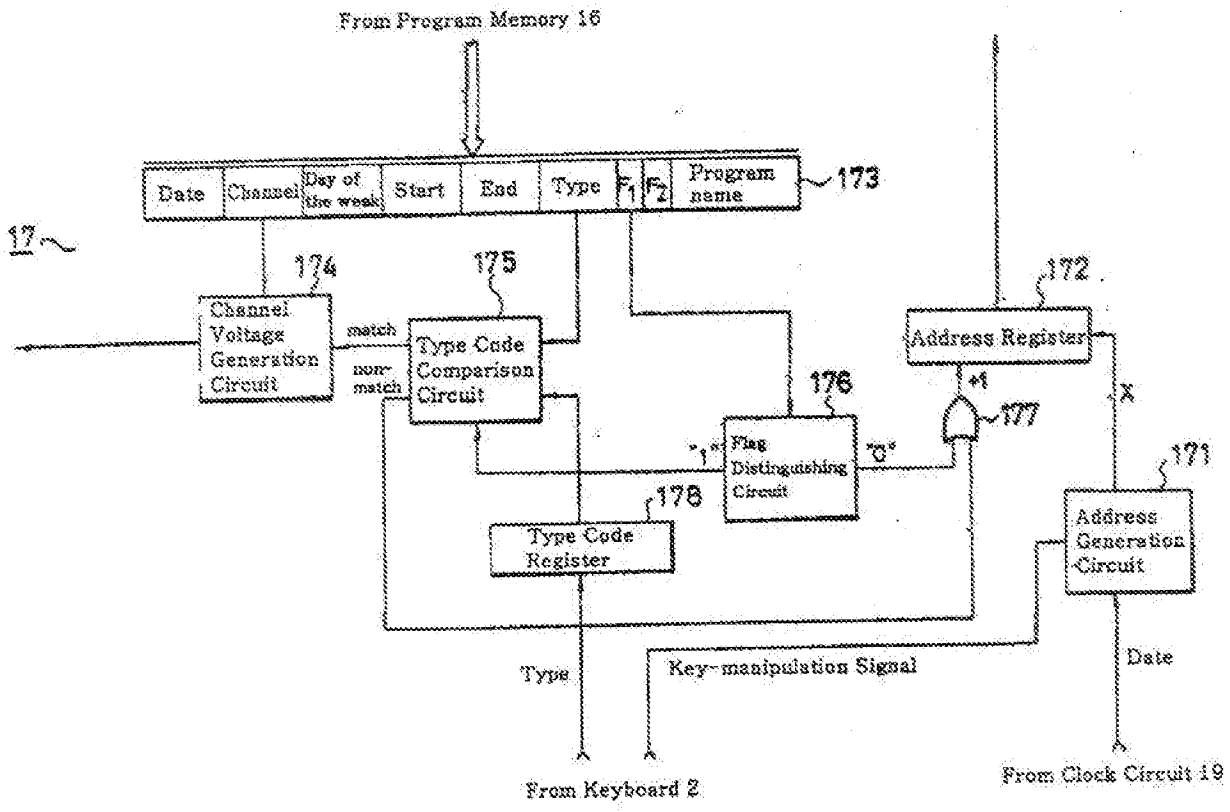

Fig. 5

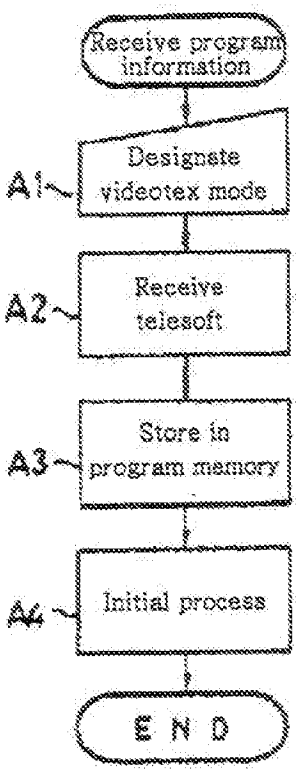
Receive program information
A1
Designate videotex mode
A2
Receive telesoft
A3
Store in program memory
A4
Initial process
E N D

Fig. 6

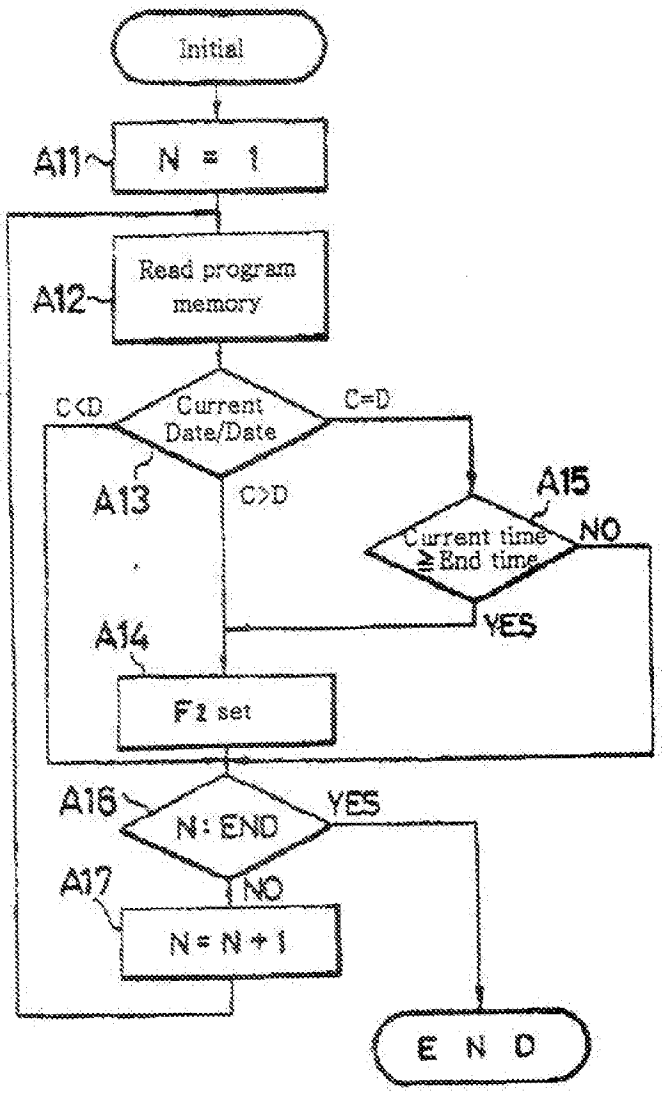
Initial
A11
N = 1
A12
Read program memory
C<D
Current Date/Date
C=D
A13
C>D
A15
Current time ≧ End time
NO
YES
A14
F 1 set
A16
N : END
YES
NO
A17
N = N + 1
E N D

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Fig. 7

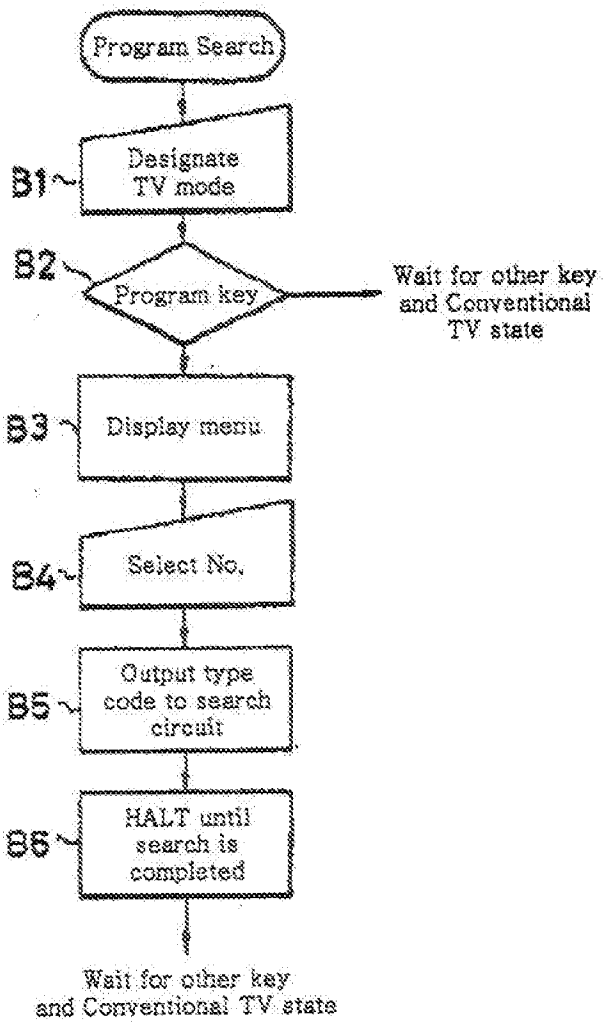


Fig. 8

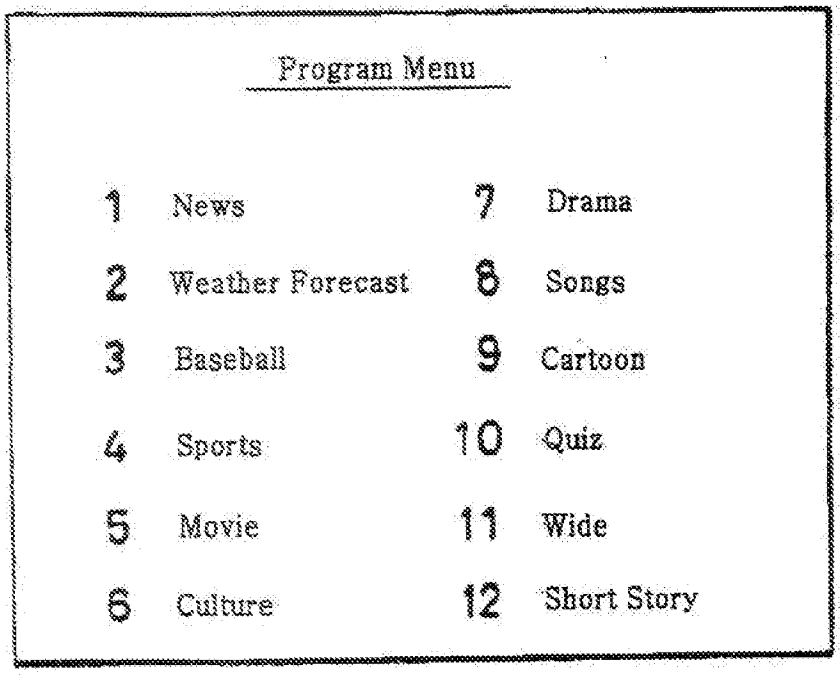

Program Menu
1 News
2 Weather Forecast
3 Baseball
4 Sports
5 Movie
6 Culture
7 Drama
8 Songs
9 Cartoon
10 Quiz
11 Wide
12 Short Story

Fig. 9

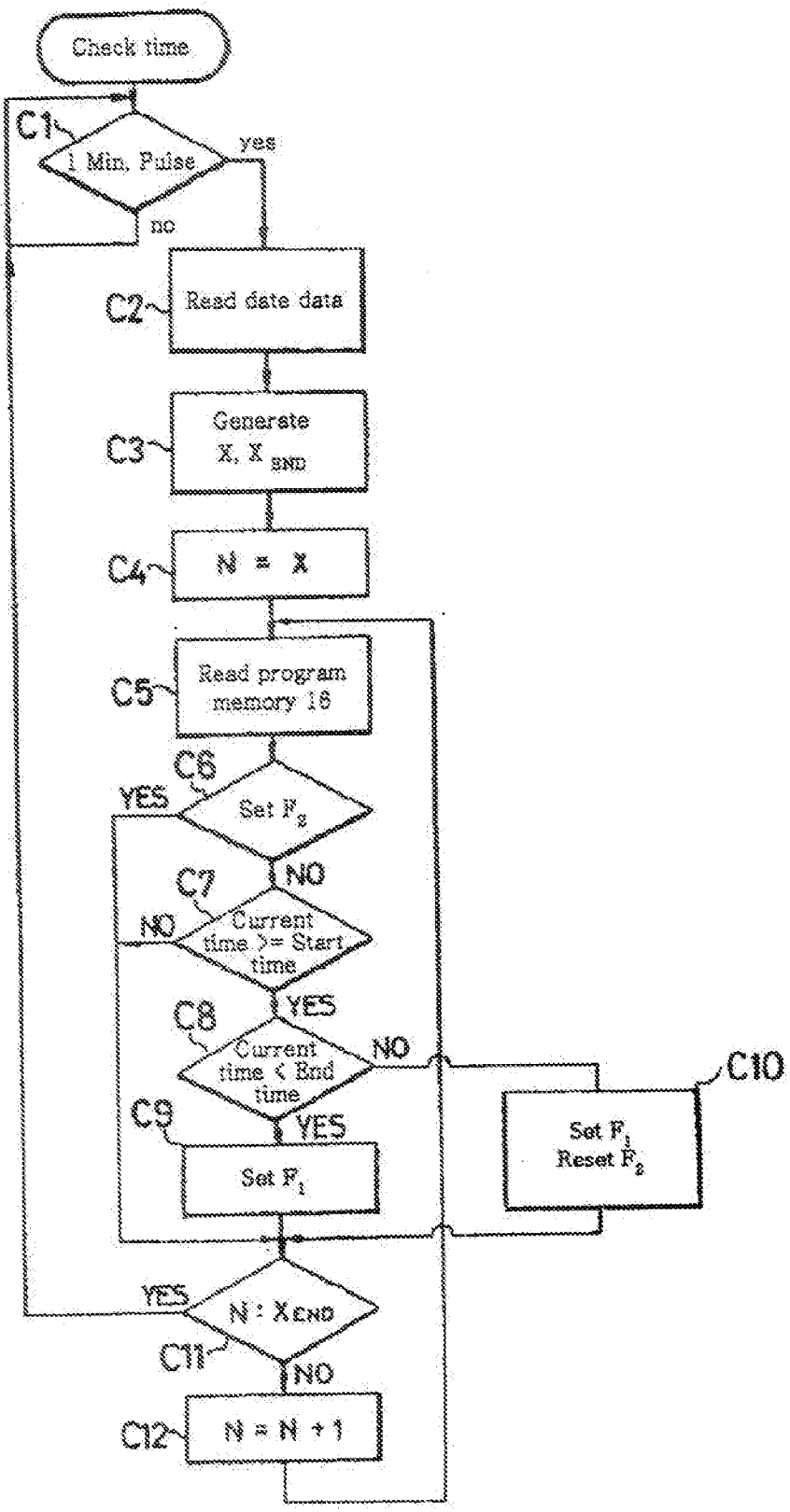

Check time
C1
1 Min. Pulse
yes
no
C2
Read date data
C3
Generate
X, X END
C4
N = X
C5
Read program
memory 18
C6
YES
Set F2
NO
C7
NO
Current
time >= Start
time
YES
C8
Current
time < End
time
NO
C10
Set F1
Reset F2
C9
YES
Set F1
YES
N : X END
C11
NO
C12
N = N + 1

Fig. 10

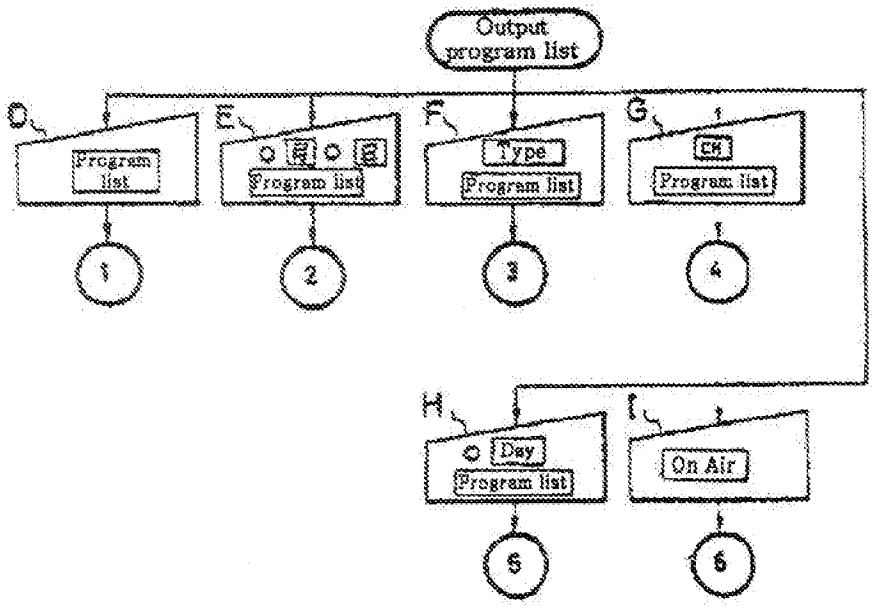

Output program list
D
Program list
E
Program list
F
Type
Program list
G
CH
Program list
1
2
3
4
H
Day
Program list
I
On Air
5
6

Fig. 11

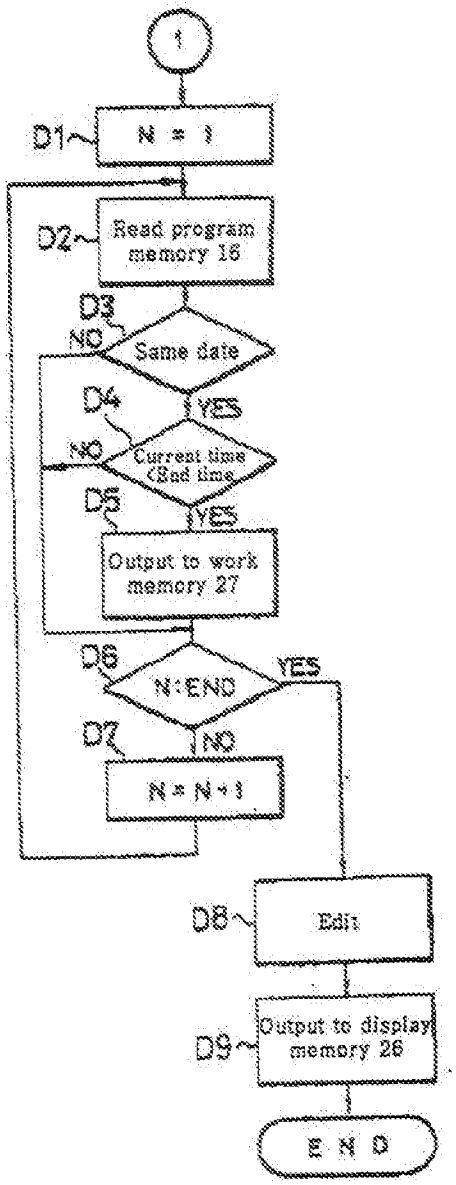

1
D1
N = 1
D2
Read program memory 16
D3
NO
Same date
YES
D4
NO
Current time ≧End time
YES
D5
Output to work memory 27
D6
N:END
YES
D7
NO
N = N+1
D8
Edit
D9
Output to display memory 26
E N D

Fig. 12

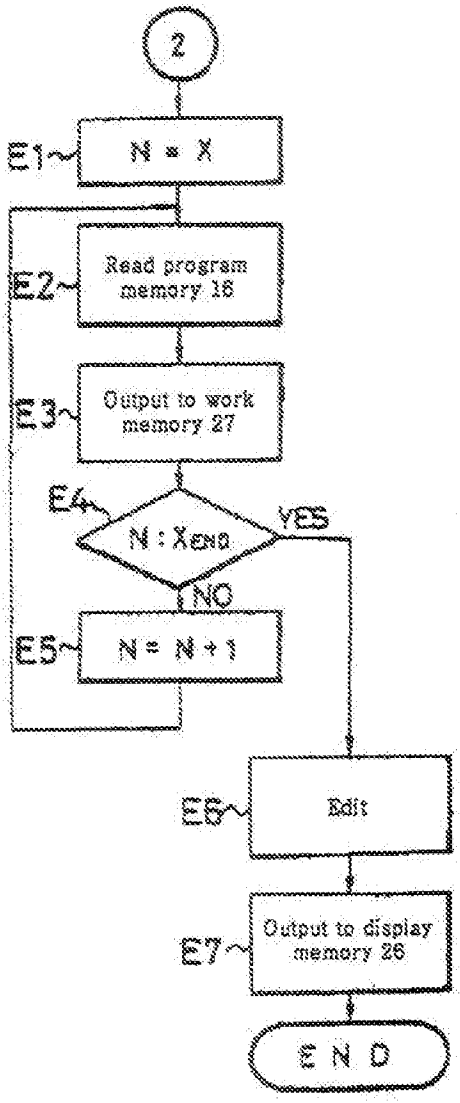

2
E1
N = X
E2
Read program memory 16
E3
Output to work memory 27
E4
N : XEND
YES
NO
E5
N = N + 1
E6
Edit
E7
Output to display memory 26
E N D

Fig. 13

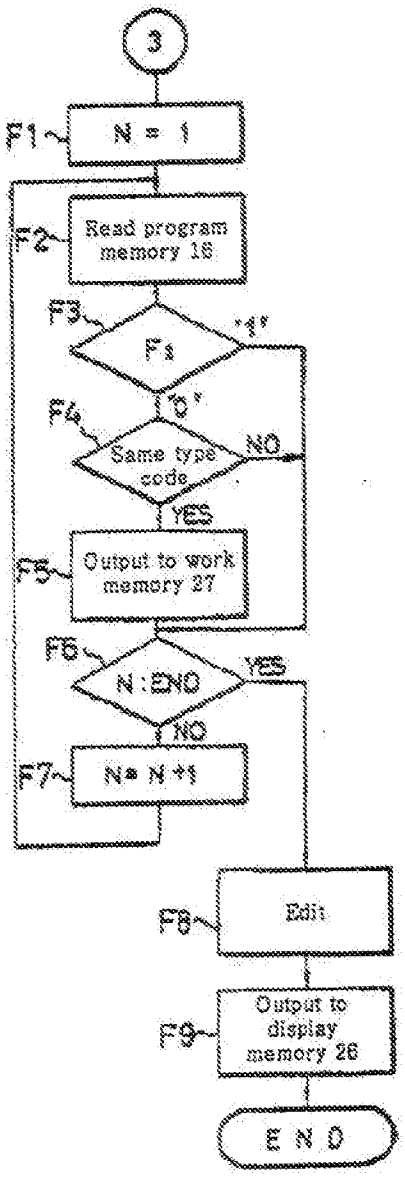

3
F1
N = 1
F2
Read program memory 16
F3
Fs
"1"
"0"
F4
Same type code
NO
YES
F5
Output to work memory 27
F6
N : END
YES
NO
F7
N = N +1
F8
Edit
F9
Output to display memory 26
E N D

Fig. 14

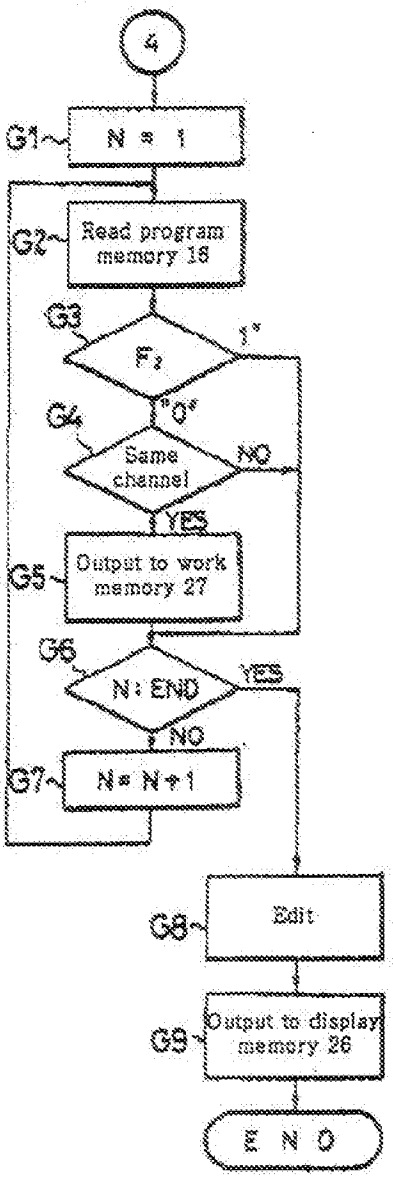

4
G1
N = 1
G2
Read program memory 18
G3
F2
"1"
"0"
G4
Same channel
NO
YES
G5
Output to work memory 27
G6
N : END
YES
NO
G7
N = N + 1
G8
Edit
G9
Output to display memory 26
E N D

Fig. 15

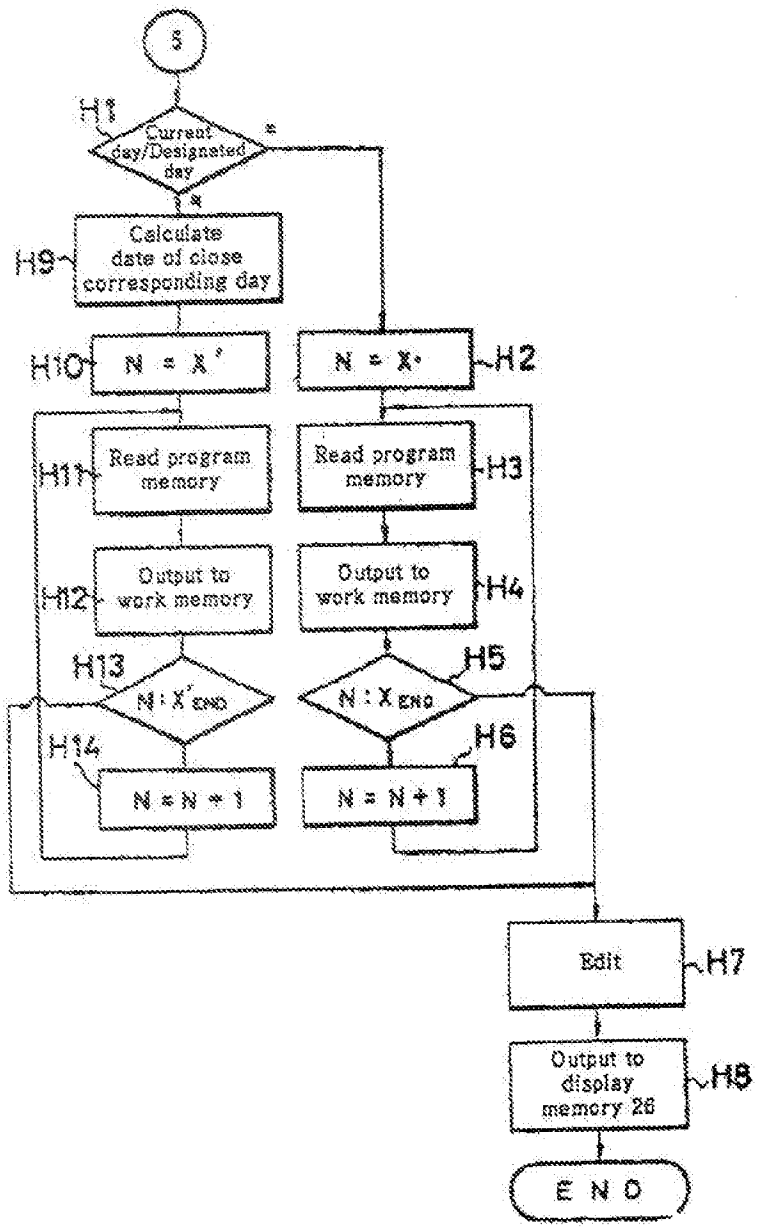
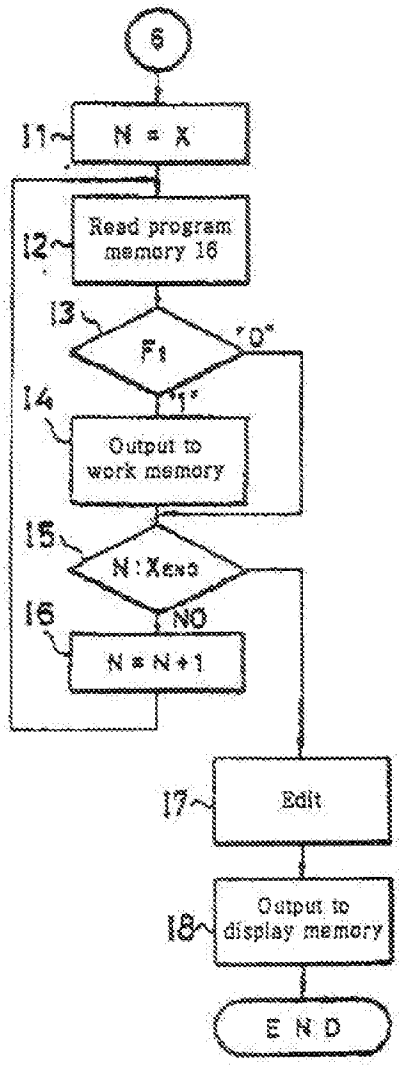

S
H1
Current day/Designated day
=
≠
H9
Calculate date of close corresponding day
H10
N = X'
N = X
H2
H11
Read program memory
Read program memory
H3
H12
Output to work memory
Output to work memory
H4
H13
N : X'END
H5
N : XEND
H6
H14
N = N + 1
N = N + 1
Edit
H7
Output to display memory 26
H8
E N D

Fig. 16


S
11
N = X
12
Read program memory 16
13
F1
"0"
"1"
14
Output to work memory
15
N : Xend
NO
16
N = N+1
17
Edit
18
Output to display memory
E N D